REMARKS

Claims 1-10, 12-41 and 43-55 are pending in the Application and are now presented for examination. Claims 1, 3, 6, 7, 16, 17, 19, 20, 22, 26, 29, 31, 34, 40, 41, 47, 48, 50, 52, 53 and 54 have been amended. Claims 11 and 42 have been cancelled, without prejudice and without disclaimer of subject matter. No new matter has been added.

Claims 1, 22, 31, 40 and 52 are independent.

On page 2 of the Office Action, Claims 1, 3-5, 7-10, 21, 31-33, 35-41, 51-53 and 55 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No.: 6,215,519 to Nayar in view of U.S. Publication No.: US2005/0134685 A1 issued to Egnal ("Egnal") and further in view of U.S. Patent No.: 6,583,813 issued to Enright ("Enright"). Although not noted on page 2 as rejected, the Office Action presents Claims 12-20, 22, 24, 25, 27-30 and 43-50 individually as rejected under the same grounds. Applicants respectfully traverse, and assert that Nayar, Egnal and Enright do not teach, suggest or disclose the features of amended Claim 1, whether considered alone or in combination. As an initial matter, the Office Action states that Nayar does not teach, disclose, or suggest all of the features of Claim 1. Applicants agree. Egnal and Enright also do not teach, suggest or disclose all of the features of Claim 1.

Claim 1

Amended Claim 1 recites the features of a motion detector "configured to analyze … raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas … based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals …

corresponding to each of an associated one of said changed objects." These features are not taught or suggested by Nayar, Egnal or Enright, whether considered separately or in combination.

The claimed invention, as recited in amended Claim 1, performs spatial multiplexing by sequencing between multiple areas of detection. The motion detector of Claim 1 analyzes raw video data by evaluating frame changes, and determines multiple detection areas based on the changes from frame to frame. The motion detector sequences between the detection areas so that multiple detection areas can be covered. Spatial multiplexing allows the motion detector to detect movement of different objects in more than one area and provide different outputs corresponding to each one of the moving objects. This improves the value of a monitoring system by capturing the largest amount of movement areas as possible, being that the movement areas are more probable to be of value to security needs. In addition, the motion detector of Claim 1 allows motion detection to be performed on ***raw*** data, i.e. data that has not been extensively processed and refined, such as the data needed for tracking or viewing. The claimed invention presents an advantage over tracking systems that have slow frame rates given the magnitude of pixels that must be processed during each frame to obtain object recognition for tracking and viewing objects. Because the motion detector of Claim 1 performs object recognition on raw video data, and as such, it does not need to apply conventional algorithms needed for tracking or viewing, such as color space correction, color purity correction, pixel to pixel sensitivity, stuck pixel compensation, gamma correction, etc. The use of raw video data to detect movement advantageously reduces image-related buffer memory sizes associated with the motion detector, as well as processing speed required for image processing. These reductions in size and speed result in a lower system cost.

Nayar

In striking contrast, Nayar does not perform motion detection on raw video data, but Nayar processes the data extensively so that tracking can be performed. Nayar shows that "in step 718, specific ***viewing*** parameters are generated for each object to be ***tracked*** ... In this step, it is determined on which point of the object to focus. Such a determination may be performed, for example, by determining the centroid (center of mass) of each object's area in the dilated image frame. Alternatively, the center of the bounding box for each object in the dilated image frame may be used. More preferably, a weighted average of the centroid and the center of the bounding box may be used." Col. 12, ll. 15-24. These calculations are performed because Nayar needs to process the data in order to track objects. Additionally, FIG. 6 of Nayar shows that the input to the PTZ driver unit 98 is first processed by a frame grabber 30, then by the motion detection unit 92, then by object tracking unit 94, then by coordinate tracking unit 95, and then again by scheduling unit 96 before it finally reaches the PTZ driver unit 98. Nayar, FIG. 6. "Frame grabber 30 provides the image frames to a motion detection unit … object tracking unit 94 tracks the detected objects … [and] … communicates with coordinate mapping unit 95, which maps the coordinates of objects from the coordinate system of the WAIS 10 to that of the PTZ system 20 … and PTZ scheduling unit … prioritizes the objects." Nayar, col. 9, ll. 35-50. In Nayar, there is significant processing and mapping of the data from the time the motion detector outputs the data, until the PTZ controller receives the data it needs for tracking.

Furthermore, Nayar processes the video data for viewing. Nayar shows that the hemispherical view images from WAIS 10 of FIG. 8 "can be mapped to perspective and panoramic views." Nayar, col. 13, ll. 22-24. Nayar performs this mapping to facilitate viewing. For example, Nayar states that "the image processing unit 40 maps the image data from the

WAIS 10 into either a Cartesian-coordinate system to produce a perspective image or into a cylindrical-coordinate system to produce a panoramic image. Such mapping makes it ***easier for a human operator to interpret the image*** being displayed." Nayar, col. 7, ll. 53-59. Moreover, Nayar specifically states that the output images from the WAIS 10 of FIG. 6 are viewable by a user, which extensive image processing must be performed in Nayar. "As shown in FIG. 6, the output of the PTZ system 20 may be viewed on a display 50 in real time." Nayar, col. 9, ll. 65-67. After recording the output, "a user is able to view not just detailed images of the objects of interest, but also their surroundings." Nayar, col. 10, ll. 6-9. Nayar must apply visual perception algorithms to the video data in FIG. 6, as Nayar uses wide angle lens distortion correction to make the image viewable (wide angle lens distortion correction is only needed when viewing by a human).

Not only does Nayar not work with raw video data, but Nayar also does not perform sequencing. In Nayar, "when a single PTZ system is used to ***track*** multiple objects, as in the embodiment of FIG. 6, the PTZ system 20 must be time-shared among the objects being tracked." Col. 9, ll. 46-48. Nayar merely performs tracking as opposed to sequencing one camera between multiple movement detection areas. The claimed invention finds multiple detection areas, and sequences back and forth between the areas. This is very different than just tracking objects. Nayar is attempting to track objects, while the claimed invention is improving the value of a video recording system by capturing the largest amount of detection areas as possible being that these areas are much more probable to be of value to security needs. Applicants respectfully assert that Nayar does not teach, suggest or disclose a motion detector configured to "analyze said raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas in a field of view of said

lens based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals," as recited in Claim 1.

Egnal

Egnal also does not teach, suggest or disclose a motion detector configured to "analyze said raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas in a field of view of said lens based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals," as recited in Claim 1. Egnal, like Nayar, does not perform detection on raw video data, but instead processes the data extensively. In Egnal, a camera obtains an image which is ***processed*** by vision module 22. ¶[0060] and FIGs. 2 and 4. Vision module 22 includes a foreground segmentation unit 41 that includes a motion detector module 41a. ¶[0061]. "A vision module 22 processes the stored image data, performing … fundamental threat analysis and tracking. In particular, vision module 22 uses the image data to detect and classify targets." ¶[0060]. The data from the camera is ***further processed*** by change detection module, a blobizer, a target tracker, a classifier, a generation module, interference module, and a response model. ¶[0065], [0066], [0069], [0070], [0071], [0073] and FIG. 4. The response model then sends data to a slave, where the images are displayed or stored in memory for later review. ¶[0073] and [0075]. A receiver then finally receives the data, and sends it to a PTZ controller. ¶[0075]. In addition, "the pictures or short video clips … [are] later review[ed] by a ***human*** watchstander." ¶[0094]. As such, Egnal works on video data that has been vastly processed, and does not detect movement on raw video data.

Not only does Egnal not perform motion detection on raw video data, but Egnal also does not sequence between multiple detection areas. Egnal simply tracks an object with a camera without sequencing. Egnal shows that "the master [camera] 11 can also order a slave [camera] 12 to follow the target using a pan, tilt, and zoom (PTZ) camera." ¶[0040]. "The resulting system is one in which one camera detects threats, and the other robotic camera obtains high-resolution pictures of the threatening targets." ¶[0040]. "When there are multiple targets to be tracked, the inference module 23 provides associated data to each of the multiple slave units 12. Again, the master chooses which slave pursues which target." ¶[0076]. Applicants respectfully assert that Egnal does not teach, suggest or disclose a motion detector configured to "analyze said raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas in a field of view of said lens based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals," as recited in Claim 1.

Enright

Enright also does not teach, suggest or disclose the above features of Claim 1. Enright shows "capturing image data … responsive to programmed sequences." Abstract. Enright does not perform detection on raw video data and does not perform sequencing. In Enright, the images are ***viewed*** by an operator. Enright, col. 18, ll. 42-44; col. 32, ll. 9-11. "FIG. 17 discloses a screen or display 296. Display 296 includes sets of images 298, 300, 302 and 304. Each image set includes "thumbnails" of five images." Enright, col. 37, ll. 31-34. "The user terminal enables a ***user*** to scroll through a series of images, displaying one or more of the ***images on the display*** at a time, by selecting certain icons with an input device. The icons enable the

user to selectively display images." Enright, col. 37, ll. 56-59. Because Enright's images are viewed by an operator, Enright must perform processing of the images and does not perform motion detection on raw image data. Additionally, Enright does not perform sequencing, as the cameras in Enright have a specific position and field of view. Enright shows a "camera 28 … positioned adjacent to the ATM with a field of view to observe a service area of the ATM. Camera 28 in the exemplary embodiment shown is directed to observe the back of the ATM and is usable for observing or detecting service activities ... A further camera 30 … is positioned adjacent the ATM and within the interior of the cabinet of the ATM. Camera 30 is shown having a field of view which is directed generally opposite to that of camera 28 and enables it to view areas which would normally include the face and hands of servicing personnel." Nothing in Enright shows that the cameras are "sequence[d] between the multiple detection areas having the presence of changes." Applicants respectfully assert that Enright does not teach, suggest or disclose a motion detector configured to "analyze said raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas in a field of view of said lens based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals," as recited in Claim 1.

For all the above reasons, Applicants respectfully assert that Nayar, Egnal or Enright, whether considered alone or in combination, do not teach the above features of Claim 1. For at least this additional reason, Claim 1 is believed patentable, and Applicants request the withdrawal of the rejection of this claim.

Independent Claims 22, 31, 40 and 52

Independent Claims 22, 31, 40 and 52 have been amended to include the features of "analyze said raw video data to detect changes from a first video frame to a next video frame; determine changes of objects in multiple detection areas in a field of view" of said lens "based on the presence of changes from the first video frame to the next video frame; sequence between the multiple detection areas having the presence of changes; and provide a plurality of sequenced detector output signals" as are also recited in independent Claim 1. Claims 22, 31, 40 and 52 are believed patentable for at least the same reasons discussed above with respect to Claim 1. As such, the withdrawal of the rejection of these claims is respectfully requested.

Claims 3-5, 7-10, 12-21, 24, 25, 27-30, 32-33, 35-39, 41, 43-51, 53, 54 and 55 depend directly or indirectly from independent Claims 1, 22, 31, 40 and 52 discussed above. These claims recite additional limitations which, in conformity with the features of their corresponding independent claim, are not disclosed or suggested by the art of record. These claims are therefore believed patentable. However, the individual reconsideration of the patentability of these claims on their own merits is respectfully requested.

On page 12 of the Office Action, Claims 2, 6, 23, 26 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nayar, Egnal and Enright in view of U.S. Patent No. 6,830,388 to Kajino *et al.* Claims 2, 6, 23, 26 and 34 depend directly from independent Claims 1, 22 and 31 discussed above. These claims recite additional limitations which, in conformity with the features of their corresponding independent claim, are not disclosed or suggested by the art of record. These claims are therefore believed patentable. However, the individual reconsideration of the patentability of these claims on their own merits is respectfully requested.

For all of the above reasons, the claim objections are believed to have been overcome placing Claims 1-10, 12-41, and 43-55 in condition for allowance, and reconsideration and allowance thereof is respectfully requested.

Of note, Applicants' undersigned representative is registered to practice before the United States Patent & Trademark Office. In accordance with 37 C.F.R. § 1.34 and M.P.E.P. § 405, the signature of Applicants' undersigned representative is representation that he is authorized to represent Applicants and the assignee on whose behalf he is acting.

The Examiner is encouraged to telephone the undersigned to discuss any matter that would expedite allowance of the present application.

The Commissioner is hereby authorized to credit overpayments or charge payment of any additional fees associated with this communication to Deposit Account No. 502104.

Respectfully submitted,

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